

REMOVABLE HEAT SHIELD FOR COOLING/HEATING UNIT**Description****Background of the Invention****Field of the Invention**

5 The present invention relates to a cover for an air conditioner or swamp cooler, and more specifically, a removable heat shield structure for an outdoor cooling unit or combination heating and cooling unit designed to shield it from sunlight without restricting airflow thereto, which cover is easy to install and remove on a seasonal basis and can be positioned as desired to provide proper shading.

10 **Description of the Prior Art**

 Conventional outdoor air conditioning units typically include a housing having a compressor, condenser and various other components therein. A fan is also disposed within the housing and operates simultaneously with the compressor to assist in heat removal therefrom. However, because the unit is located outdoors, it is constantly being
15 subjected to heat and sunlight. The heat and energy generated by the sun's rays impede the heat transfer rate from the compressor to the atmosphere resulting in less efficient cooling of the building interior.

 Running an air conditioner on hot sunny days consumes substantial amounts of electricity. Government studies have shown that shading an air conditioning unit on such
20 days can reduce electricity consumption by as much as 50%.

 The large air conditioning units for cooling the entire house or building are usually combined with the heating units, so that in the cooler months when the heating part of the unit is in use, the cover must be removed. Most of the prior art devices involve

structures that are more permanent roof or shelter type installations, which do not lend themselves to easy annual installation and removal. Most of the prior art devices are reflective and deflecting in function but do not provide heat dissipation.

U.S. Patent #4,730,423, issued 3/15/1988 to Hughes, discloses a sun protection
5 assembly for shielding an air conditioner/heat pump from the direct rays of the sun. The assembly comprises a frame to which a screen is attached. Front and rear legs are attached to the frame to support the assembly a predetermined distance above the ground. Embodiments are provided for air conditioners located on rooftops or on the ground.

U.S. Patent #3,379,481, issued 4/23/1968 to Fisher, illustrates a cover for
10 externally positioned air conditioning apparatus, such as a unit that is mounted on a roof. The cover is designed to protect the cooling apparatus from the direct rays of the sun.

U.S. Patent Application #20030037558, published 2/27/2003 by Torres, depicts a simple one-piece, flexible, lightweight and portable shade apparatus for an evaporative or "swamp" cooler that can collapse for transport or storage and does not require tools or
15 equipment for installation. The shade apparatus does not blemish or deface the cooler unit or the attached dwelling in any way.

U.S. Patent #5,226,264, issued 7/13/1993 to Walters, provides a portable shelter for air conditioner units, which comprises a frame assembly mounted on wheels. The shelter is configured to have a sloping top and parallel sides. The frame assembly is
20 provided with a thermal reflective cover and anchoring means, whereby an outdoor air conditioner unit may be easily protected from the heat of the sun's rays and from the

elements, including rain, wind driven debris and leaves. The device allows the air conditioner unit to function more efficiently at a lower temperature.

U.S. Patent #4,498,912, issued 2/12/1985 to Wagner, concerns a sunscreen cover for an evaporative cooler that includes a top and side screen panels extending
5 downwardly from the top to cover the sides of an evaporative cooler for protecting the evaporative cooler by providing shade for the cooler.

U.S. Patent #4,838,038, issued 6/13/1989 to Uecker, is for an apparatus and method of improving the efficiency of an evaporative cooling unit by shielding the unit from solar originated heat. The apparatus generally consists of a piece of insulating
10 material bounded on at least the upper surface thereof by a light-reflecting material and being detachably coupled above the evaporative cooling unit.

U.S. Patent Application #20020174671, published 11/28/2002 by Wilkinson, puts forth a solar radiation screen for an air conditioner condenser. The screen includes a support body defining an inward side configured for placement proximate to the air
15 conditioner condenser, and an outward side configured for placement proximate to a source of air to be passed through the air conditioner condenser. A plurality of solar blocking surfaces are supported by the body, the solar blocking surfaces being downward sloping from a point proximate the inward side of the support body to a point proximate the outward side of the body. The solar blocking surfaces are spaced apart from one
20 another to allow the source of air to essentially pass freely over the solar blocking surfaces and through the condenser. The solar blocking surfaces can be downward

sloping at a predetermined angle selected to prevent direct solar radiation from passing between the solar blocking surfaces and to the condenser.

U.S. Patent #5,158,486, issued 10/27/1992 to Tamame, shows a lightweight weather-resistant cover for attachment to air conditioner compressor cabinets of the type
5 containing a fan and that has an opening in a wall of the cabinet for exhausting air. The cover has an attachment portion for attachment to the cabinet wall adjacent the exhaust opening and a lid portion of sufficient size to cover the exhaust opening and is hinged to the attachment portion. The lid portion is normally maintained in a closed position covering the exhaust opening when the fan is not operating and is pivoted to an open
10 position extending angularly above the exhaust opening by the exhaust air when the fan is operating. When the fan ceases operation, the lid portion drops back down onto the cabinet wall to cover the opening and prevent the elements and other foreign matter from entering. The attachment portion may be secured to the wall of the cabinet by a strip of magnetic material or tape. The underside of the lid portion may be provided with a
15 releasable fastener element to releasably engage the wall of the cabinet and prevent the lid portion from flapping against the cabinet wall under windy conditions when the fan is not operating.

U.S. Patent #4,745,769, issued 5/24/1988 to Wooden, Jr., claims a universal cover for covering air conditioner compressor cabinets or the like which can be installed easily
20 to protect the cabinet housing and the working parts therein. A sheet of flexible material,

such as canvas, is provided with numerous strategically placed fasteners and openings to allow the cover to fit a wide range of cabinet sizes.

U.S. Patent #6,158,175, issued 12/12/2000 to Carter, describes a substantially box-shaped cover for enclosing an outdoor air conditioning unit. The cover includes four
5 vertical side walls and a top horizontal wall each constructed with a mesh type, solar screen material which allows air to flow therethrough while refracting sunlight. The box-shaped container is formed of two detachable, foldable components allowing the device to be disassembled and compactly folded for storage. Adjacent one or more bottom peripheral edges of the cover is a latch means for securing the device to the concrete
10 foundation on which the outdoor air conditioner is typically supported. Furthermore, a decorative design element may be embossed or imprinted on the top wall or one or more side walls.

U.S. Patent #6,430,954, issued 8/13/2002 to Smith, puts forth an adjustable protective cover for use with an outdoor air conditioning unit, which comprises a
15 framework of vertical supports and upper and lower struts forming a generally cubicle configuration. The protective cover further includes a screen having a top portion and a plurality of side portions. The top portion spans between the upper struts for shielding the top of the air conditioning unit from the sun and debris. The side portions of the screen span between respective vertical supports and upper and lower struts for shielding the
20 sides of the air conditioning unit from the sun and debris. A plurality of slider bars are fixedly attached along free edges of the side portions of the screen adjacent respective

lower struts. Each vertical support defines a slot extending longitudinally therealong. The cover further includes a plurality of knob fasteners that are slidable within the slots and which are threadably connected to respective slider bars. Each side portion of the screen may be moved between open and closed configurations relative to the upper and lower
5 struts of the framework upon slidable movement of a respective fastener along a slot path. As the fastener may threadably tighten or loosen a slider bar relative to a vertical support, the side portions may be held in partially open or closed configurations.

What is needed is a removable heat shield for a combined air conditioner and heater, which can be easily installed and removed seasonally and can be positioned for
10 best shading and provide heat dissipation.

Summary of the Invention

An object of the present invention is to provide a removable heat shield for a combined air conditioner and heater unit which can be easily installed and removed seasonally and can be positioned for best shading and provide heat dissipation.

15 Another object of the present invention is to provide a three layered heat dissipating and shading covering with a bottom canvas layer for strength, a middle heat insulating layer such as foil or fiberglass, and a top reflective or heat dissipating material layer such as shiny colored outdoor umbrella material, that can be stretched over an easily installed framework, which provides an instantly attachable and removable heat
20 dissipation shade at a very low cost.

One more object of the present invention is to provide adjustable frame members that can be installed on any type of unit with the tops of the frame members wider than the unit to maximize the shading of the unit.

An additional object of the present invention is to provide frame members with
5 stretched heat shield fabric covering that can be positioned as needed for the prevailing building orientation relative to the path of the sun.

A further object of the present invention is to provide a reflective upper surface of the heat shield sheet, which provides a cooler source of shade with the heat reflected off the top of the sheet leaving the bottom of the sheet cooler.

10 In brief, a removable heat shield is presented for a combined air conditioner and heater unit having a top vent, which can shield be easily installed and removed seasonally. The heat shield has adjustable frame members that can be installed on any type of unit, which can be positioned for best shading as needed for the prevailing building orientation relative to the path of the sun. The frame comprises a first anchoring
15 frame, adjustable elevating frame pieces and a second anchoring frame. The heat shield also comprises a heat dissipating and shading covering that can be easily stretched over the installed framework, which provides instantly attachable and removable heat dissipating shade. The heat shield preferably comprises a three layered heat dissipating covering with a bottom canvas layer for strength, a middle insulating layer, and a top
20 reflective or heat dissipating material layer. The upper surface of the heat shield provides a cooler source of shade with the heat dissipated from the top of the shield leaving the bottom of the shield cooler. The heat shield further comprises a tie down means that is

capable of stretching and maintaining the heat dissipating and shading sheet in a taut condition. An anchoring means is provided for affixing the device to the roof of a house, which comprises loops in the ends of the canvas, anchoring rigid rods that fit through the loops, external support brackets and a tie down means, such as straps.

5 An advantage of the present invention is that it can be easily installed.

 Another advantage of the present invention is that it can be positioned for best shading relative to the path of the sun.

 An additional advantage of the present invention is that it dissipates the heat.

 One more advantage of the present invention is inexpensive to manufacture.

10 Yet another advantage of the present invention is that it can be removed during the cooler seasons and stored.

 Still another advantage of the present invention is that it may reduce electricity consumption by as much as 50%.

Brief Description of the Drawings

15 These and other details of my invention will be described in connection with the accompanying drawings, which are furnished only by way of illustration and not in limitation of the invention, and in which drawings:

 FIG. 1 is a side elevational view of the removable heat shield device with a heat dissipating and shading sheet mounted on frames over a combined cooling/heating unit
20 on a roof;

 FIG. 2 is a front elevational view of an elevating frame of the invention of FIG. 1;

FIG. 3 is a front elevational view of the pivotable anchor frame of the invention of FIG. 1;

FIG. 4 is a perspective view of the combined cooling/heating unit with the elevating frames and pivotable anchor frame mounted thereon;

5 FIG. 5 is a cross-sectional view taken through a preferred embodiment of the heat dissipating and shading sheet formed in three layers.

Best Mode for Carrying Out the Invention

In FIG 1-3, a removable heat shield device 20 for a cooling/heating unit 30 with a top vent 31 positioned in a housing outdoors comprises a heat dissipating shading sheet
10 29 stretched over the unit on an adjustable removable frame system. A first anchoring frame comprises a first rigid elongated anchoring rigid rod element 21 attachable by brackets 22A to an external surface, such as a roof 40, in line with and spaced apart from a base 32 on the side of the housing of an outdoor cooling unit 30. The heat dissipating and shading sheet 29 has a first loop of material 17A at the first end across the width of
15 the sheet 29 with the rigid rod 21 of the inserted through the first loop of material 17A.

The device 20 also comprises adjustable elevating frames 23, shown in FIG. 2, which attach to the housing of the outdoor cooling unit 30. Each of the adjustable elevating frames 23 comprise a rigid elongated elevating element 24 positioned apart from and above the housing of an outdoor cooling unit 30 and wider than the unit. Each
20 of the adjustable elevating frames 23 further comprise an attaching portion, such as elevating frame legs 25A. The elevating frame legs 25A are adjustable in width by adjusting a telescoping elongated elevating element 24. An extension loop 19 on each

side extending beyond the sides of the unit 30 enable a heat shield wider than the cooling unit to be stretched over the unit to insure shade. The elevating frame can be attached to any of a variety of sizes and shapes of cooling unit 30 housings.

A first elevating frame 23 is attached to the housing of an outdoor cooling unit 30
5 with the first rigid elongated elevating element 24 above one side of the housing adjacent to the first anchoring frame rod 21. A second elevating frame 23 is attached to the housing of an outdoor cooling unit 30 with the second rigid elongated elevating element 24 above the other side of the housing adjacent to a second anchoring frame 26. The first and second rigid elongated elevating elements 24 are both wider than the housing of the
10 outdoor cooling unit 30 and capable of elevating the heat dissipating and shading sheet 29, which is wider than the housing, spaced apart from and above the housing, as shown in FIG.1.

The second anchoring frame 26, shown in FIG. 3, has a second rigid elongated anchoring element, an anchoring rigid rod 27 positioned apart from the housing of the
15 cooling unit 30 and wider than the unit, on an opposite side of the housing from the first anchoring frame 21. The second anchoring frame 26 also comprises an adjustable attaching means, such as a telescoping rigid rod 27, which is adjustable in length to enable the second anchoring frame 26 to be attachable to any of a variety of widths of cooling and heating unit 30 housings by a pivotable means such as a pivot pin 18.

20 The heat dissipating and shading sheet 29 has a second loop of material 17B at the second end, across the width of the sheet 29 that the two telescoping ends of the second anchoring rigid rod 27 are capable of being inserted through the loop and interconnected

or the loop may be formed by wrapping an end of the sheet around the second anchoring rod and stitched onto an inner portion of the sheet.

The heat dissipating and shading sheet 29 is stretched over the two adjustable elevating frames 23. The sheet 29 is wider than the housing of the outdoor cooling unit 30, so that the sheet 29 shields the housing from direct sunlight, as shown in FIG. 1. The heat dissipating and shading sheet 29 preferably comprises a three layered heat dissipating covering with a bottom canvas layer 29C for strength, a middle heat insulating layer 29B such as foil or fiberglass, and a top reflective or heat dissipating material layer 29A such as shiny colored outdoor umbrella material, is seen in FIG. 5.

The first anchoring frame 21 and the second anchoring frame 26 and the elevating frames 23 are capable of being aligned with the track of the sun across the sky so that the housing of the cooling and heating unit 30 is normally shaded by the heat dissipating and shading sheet 29, as shown in FIG. 1.

The device 20 also comprises a tie down means, such as straps 28, which are capable of being attached between the second anchoring frame 26 and an external support, such as brackets 22B adjacent to and spaced apart from the base 32 of the housing. The tie down means 28 are pulled tight pivoting the second anchoring frame 26 to stretch the heat dissipating and shading sheet 29 secured to hold down the second anchoring frame 26, so that the heat dissipating and shading sheet 29 is maintained in a stretched taut condition, as shown in FIG. 1.

In practice, the first anchoring rod 21 would be secured to the roof with brackets 22A at each end, the two elevating frames 25 mounted on the housing of the

cooling/heating unit 30, and the heat dissipating and shading sheet 29 stretched over the elevating frames, the second anchoring frame 26 attached to the unit and the straps 28 pulled to stretch the sheet 29 and secured to the roof by brackets 22B. The sheet would be oriented with the first anchoring frame 21 and the second anchoring frame 26 and the
5 elevating frames 23 in position with the path of the sun across the sky, so that the housing of the cooling and heating unit 30 would normally be shaded by the heat dissipating and shading sheet 29.

The removable heat shield device 20 may be easily disassembled and stored during the cooler seasons when the combination heating/cooling unit is used for heating
10 with the top heat vent 31 open to the air.

It is understood that the preceding description is given merely by way of illustration and not in limitation of the invention and that various modifications may be made thereto without departing from the spirit of the invention as claimed.